Microtomography of the Spruce Beetle

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Spruce bark beetles and their associated fungi have killed thousands of spruce trees in Alaska with over 3 million total acres heavily impacted in the last 15 years. We have been studying beetle and fungal interaction in a Long Term Ecological Research (LTER) project in order to better understand beetle population outbreaks and spruce tree defenses. We continue to use the X-ray computed microtomography facilities at X27A to image the internal structure of beetles and the spatial relationship between the beetle and fungal spores. The images have a resolution down to 3 micron voxels and a field of view of over 5 millimeters. The instrument is illumination by a monochromator with 1% bandpass and energy tunable between 6 – 10 keV. Rendered volumes have been successfully obtained with monochromatic X-rays at about 9keV, providing important density and spatial information about physiologically important structures governing host pathogen interactions.